

AN ECOLOGICAL SURVEY OF THE
PROPOSED RUTH RESEARCH NATURAL AREA,
TRINITY COUNTY, CALIFORNIA¹

by

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July 1981

¹ Report to Region 5 - PSW Research Natural Area
Committee, U.S. Forest Service.

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The Ruth Candidate Research Natural Area is located in the Mad River Ranger District of the Six Rivers National Forest. The area surveyed for this report is that area referred to as Enclosure 3 in the 1979, Reconnaissance Report, Proposed Ruth Research Natural Area by Douglas F. Roy, Charles P. Weatherspoon and Robert J. Laacke. This includes a part of S $\frac{1}{2}$ Sec. 27 that lies south of road 1502, N $\frac{1}{2}$ sec. 34, NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec 34, most of Sec. 35 that lies south of road 1502 and a small part of the W $\frac{1}{2}$ Sec. 36, T 29 N, R7E, NM. This area includes about 1320 acres (542 hectares). The northern boundary is road 1502 which is approximately the crest of South Fork Mountain. The southern boundary generally follows private property lines. The east and west boundaries follow private property lines. The east and west boundaries follow ridgelines (watershed boundaries), Figure 1.

Topographically the entire area lies on the relatively uniform south west-facing slope of South Fork Mountain. Small streams have dissected the uniform slope resulting in several draws with steep west and south facing slopes. The South Fork Mountain Fault crosses the area at approximately the 4000 foot contour. Above the fault, which includes most of the area, the slopes are fairly moderate, with numerous benches. These slopes vary from 5 to 50%. Below the fault line (southwest of faultline), the slopes are considerably steeper varying from 70 to 100%.

The elevation range from 2800 (860 meters) to 5781 feet (1764 meters). Most of the heavy timber lies between 4000 and 5000 feet. The landscape is exemplary of North Coast midelevation topography.

Geologically the candidate area is similar to much of the mid-elevation North Coast Region. The forests north of the fault line are found on Mesozoic Pre-Cretaceous undifferentiated metasedimentary rocks, primarily schists which extend from the Yolla Bolly Mountains to the East. The forests on the steep slopes south of the fault line lie on the massive graywacke rocks of the Franciscan formation, which is one of the major rock formations of the north coast area. The area has some unstable, colluvial slopes, with evidence of recent slope movement. The soils on the moderate slopes and benches are a deep gravelly loam. The soils on the steeper slopes are thin and rocky. Only a few areas have rocks on the surface.

The climate is typical for the interior north coast ranges. The average annual precipitation is 70 inches with most of this occurring from November to March. The January mean minimum temperature is 32° F and the July mean maximum temperature is 90° F.

The vegetation of the area consists of old-growth *Pseudotsugamenziesii* - Mixed Evergreen forests on the lower slopes, mixed-conifer (*Abies*-*Pseudotsuga*-*Pinus*) on the mid-elevation slopes, oak-conifer woodlands in the western portion of the areas and montane chaparral on the upper slopes.

Methods and Materials

A preliminary reconnaissance was made in September 1980, at which time an inventory of vascular plants was initiated. Only plants of

unknown taxa were collected. These were identified at the Humboldt State Herbarium (HSC), with all voucher specimens on deposit. From this reconnaissance four major vegetation types were proposed in the area, a Mixed-Evergreen forest dominated by Douglas-fir, (*Pseudotsuga menziesii*); Canyon live oak, (*Quercus chrysolepis*); and Madrone (*Arbutus menziesii*); a mixed-conifer forest dominated by white fir, (*Abies concolor*); Douglas-fir and Ponderosa pine, (*Pinus ponderosa*), a oak-conifer woodland dominated by California black oak (*Quercus Kelloggii*) and a montane chaparral dominated by *Quercus vaccinifolia* and *Quercus Garryana* var. *Breweri*.

After the general reconnaissance, species composition of the canopy, understory, and ground layers were sampled using 36 relevés. In representative areas, species coverage was estimated using standard sampling techniques (Mueller-Dombois and Ellenburg 1974). Association tables were then developed to determine compositional differences between forest vegetation types.

Stand analyses

Each forest type was sampled for tree density and basal area growth. All trees were measured on plots 1/8.7 acres (100 x 50 ft) in size to determine tree density and growth. Thirteen density plots were taken throughout the study area. Site trees were measured on most relevés and all density plots.

Results

Some 109 taxa were recognized in the proposed natural area (Appendix I). The plants are typical of mid-elevation interior north-east and Klamath Region flora. No rare or endangered species were encountered.

Forest Composition

The 36 releves were assembled into a series of association tables to demonstrate compositional differences. The final presence table (Table I) illustrates three major forest types: Mixed-Conifer type, Mixed-Evergreen and the Oak-Conifer Woodland type. The approximate acreage of each type is listed in Table II. The Mixed-Conifer type was divided into three phases and the Oak-Conifer Woodland type was divided into two phases. The location and approximate area covered by each type is shown on Figure 1.

Mixed-Evergreen Forest Type

The Mixed-Evergreen forest type is dominated by Douglas-fir and is characterized by the presence of the evergreen hardwoods, madrone and canyon live oak. Ponderosa pine occurs as an occasional codominant. This type is similar to the Pinus ponderosa phase of the Pseudotsuga - hardwood forests as discussed by Sawyer et al. 1977 and is the same as SAF type # 234, Douglas-fir - Tanoak - Pacific Madrone (Eyre, 1980).

These forests are found on approximately 92 acres in the extreme southwest portion of the proposed natural area generally below 3800 ft. in elevation. The topography is steep (70 to 100 % slope) with occasional level benches. The general aspect is southwest. The soils are a poorly developed gravelly loam.

Throughout this Mixed-Evergreen type the stands are dominated by large-size Douglas-fir and ponderosa pine, which overlie younger pole-sized mixture of Douglas-fir and the hardwoods: canyon live oak and madrone. This younger age class apparently became established following

Table I

Presence (P%) and modal cover/abundance (C/A) for all sampled trees, shrubs and herbs. Cover abundance scale 1 = one individual, 2 = rare and >10%, 3 = common and <10%, 4 = 10-25%, 5 = 25-50%, 6 = 50-75%, 7 = >75%.

Type	MIXED-CONIFER						MIXED-EVERGREEN		OAK-CONIFER WOODLAND			
Phase	<i>Abies concolor</i>		<i>Abies-Pinus-Pseudotsuga</i>		<i>Pseudotsuga-Pinus ponderosa</i>				<i>Abies concolor</i>		<i>Pinus-Pseudotsuga</i>	
# of releves	4		9		4		5		4		6	
Trees, upper canopy	P %	C/A	P %	C/A	P %	C/A	P %	C/A	P %	C/A	P %	C/A
<i>Abies concolor</i>	100	5	100	4	--	-	--	-	--	-	--	-
<i>Libocedrus decurrens</i>	100	3	89	4	50	3	--	-	--	-	--	-
<i>Pinus lambertiana</i>	100	4	78	3	75	4	--	-	50	3	--	-
<i>Pinus ponderosa</i>	100	4	100	4	100	6	60	4	100	4	50	4
<i>Pseudotsuga menziesii</i>	--	-	89	4	75	4	100	6	50	3	17	5
<i>Acer macrophyllum</i>	--	-	11	3	--	-	20	3	--	-	33	4
<i>Arbutus menziesii</i>	--	-	--	-	--	-	60	3	--	-	--	-
<i>Quercus chrysolepis</i>	--	-	--	-	--	-	20	6	--	-	--	-
<i>Quercus kelloggii</i>	--	-	45	4	100	3	60	3	100	5	100	6
Understory, or lower canopy												
<i>Abies concolor</i>	100	3	89	3	--	-	--	-	100	3	--	-
<i>Libocedrus decurrens</i>	--	-	56	3	50	3	--	-	--	-	--	-
<i>Pinus lambertiana</i>	--	-	67	3	50	3	--	-	100	2	17	2
<i>Pinus ponderosa</i>	50	2	56	3	75	3	--	-	50	4	83	3
<i>Pseudotsuga menziesii</i>	--	-	45	3	50	3	80	3	--	-	50	3
<i>Quercus chrysolepis</i>	--	-	--	-	25	3	60	3	--	-	--	-
<i>Quercus kelloggii</i>	--	-	33	3	--	-	--	-	--	-	33	3
Seedlings												
<i>Abies concolor</i>	100	2	89	3	25	2	--	-	50	3	--	-
<i>Libocedrus decurrens</i>	100	2	56	3	50	2	--	-	25	3	--	-
<i>Pinus lambertiana</i>	75	2	56	3	25	3	--	-	50	3	17	3
<i>Pinus ponderosa</i>	--	-	33	3	--	-	--	-	25	3	33	3
<i>Pseudotsuga menziesii</i>	--	-	44	3	75	2	60	2	25	3	33	3
<i>Acer macrophyllum</i>	--	-	--	-	--	-	--	-	--	-	17	3
<i>Quercus chrysolepis</i>	--	-	33	3	25	3	80	3	25	3	--	-
<i>Quercus kelloggii</i>	--	-	--	-	--	-	--	-	100	3	17	3
Shrubs												
<i>Rhus diversiloba</i>	--	-	--	-	50	2	--	-	--	-	--	-
<i>Corylus cornuta</i>	--	-	44	3	--	-	--	-	100	3	--	-
<i>Rosa gymnocarpa</i>	50	2	11	2	--	-	20	2	--	-	--	-
<i>Amelanchier pallida</i>	50	2	22	3	--	-	--	-	50	3	--	-
<i>Symphoricarpos acutus</i>	--	-	--	-	--	-	--	-	50	3	17	3
<i>Rubus vitifolius</i>	--	-	--	-	--	-	--	-	--	-	17	2
<i>Prunus emarginata</i>	--	-	--	-	--	-	--	-	--	-	17	4
Herbs												
<i>Bromus tectorum</i>	50	3	67	3	50	2	60	3	50	4	100	4
<i>Elymus macounii</i>	50	2	22	2	--	-	--	-	--	-	83	4
<i>Pteridium aquilium</i>	100	2	33	3	25	2	20	2	50	4	100	5
<i>Hieracium albiflorum</i>	50	3	78	3	25	2	80	2	50	3	33	2
<i>Disporum hookeri</i>	50	2	--	-	--	-	--	-	--	-	--	-
<i>Pyrola picta</i>	50	3	33	2	--	-	--	-	50	3	17	2
<i>Trientalis latifolia</i>	50	2	22	2	--	-	20	2	--	-	--	-
<i>Polystichum imbricans</i>	--	-	22	2	--	-	--	-	--	-	--	-
<i>Polystichum munitum</i>	--	-	22	1	--	-	--	-	--	-	--	-
<i>Goodyera oblongifolia</i>	--	-	22	2	--	-	--	-	--	-	--	-
<i>Adenocaulon bicolor</i>	--	-	11	3	--	-	--	-	--	-	--	-
<i>Iris tenuissima</i>	--	-	11	2	--	-	--	-	--	-	--	-
<i>Dryopteris arguta</i>	--	-	11	3	--	-	--	-	--	-	--	-
<i>Apocynum androsaemifolium</i>	--	-	11	2	--	-	40	2	--	-	--	-
<i>Pterospora andromedea</i>	--	-	--	-	25	2	40	2	--	-	--	-
<i>Galium spp.</i>	--	-	--	-	25	2	60	2	--	-	17	3
<i>Chimaphila umbellata</i>	--	-	--	-	--	-	20	2	--	-	--	-

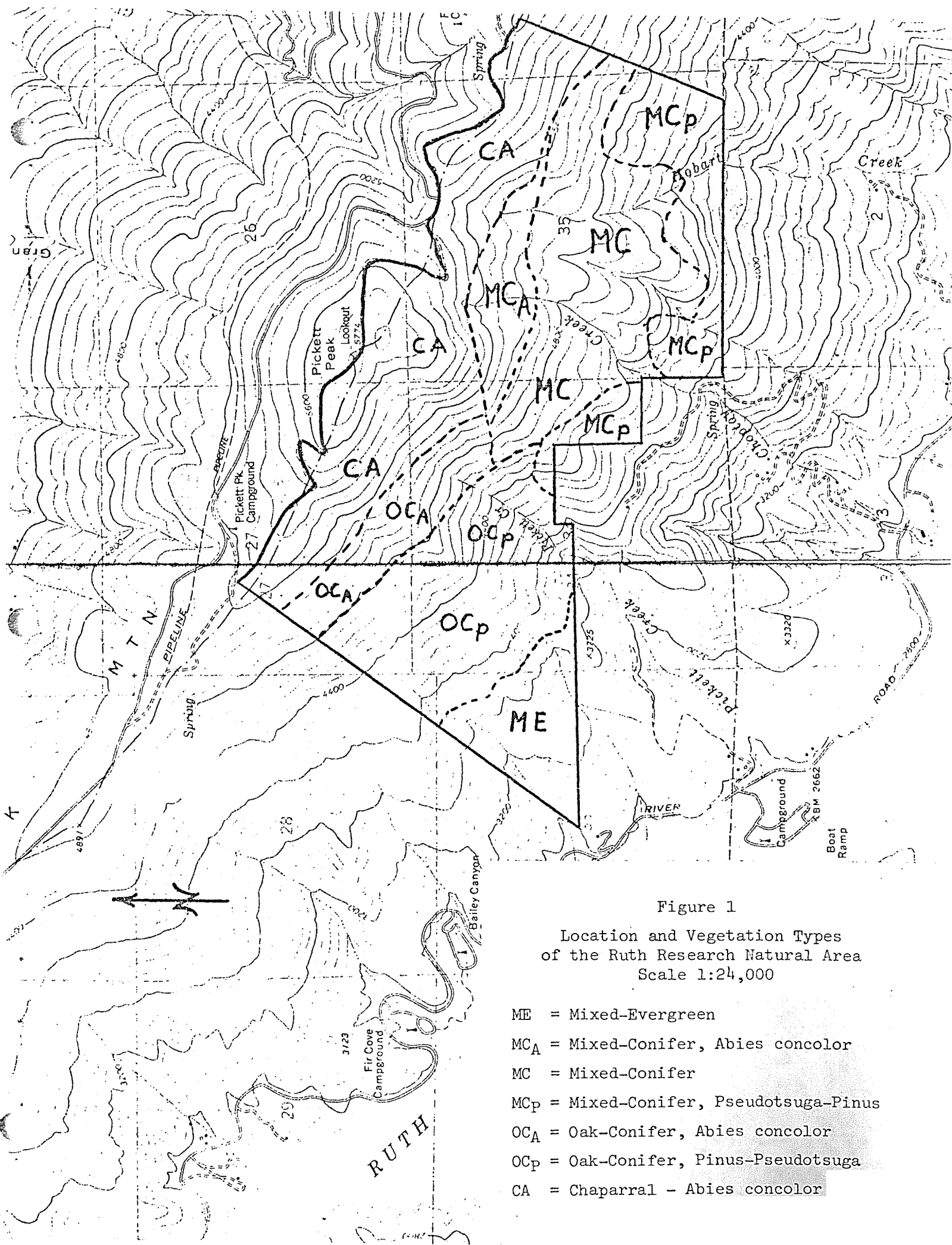


Figure 1
 Location and Vegetation Types
 of the Ruth Research Natural Area
 Scale 1:24,000

- ME = Mixed-Evergreen
- MC_A = Mixed-Conifer, *Abies concolor*
- MC = Mixed-Conifer
- MC_p = Mixed-Conifer, *Pseudotsuga-Pinus*
- OC_A = Oak-Conifer, *Abies concolor*
- OC_p = Oak-Conifer, *Pinus-Pseudotsuga*
- CA = Chaparral - *Abies concolor*

Table II

Approximate Acreage of Forest Types in the
proposed Ruth Natural Area

Type	Acres
Mixed-Evergreen	92
Oak-Conifer Woodland	338
Abies concolor phase	- (95)
Pinus Pseudotsuga phase	- (243)
Mixed-Conifer	500
Abies concolor phase	- (60)
Abies-Pinus-Pseudotsuga phase	- (280)
Pseudotsugo-Pinus phase	- (160)
Chaparral - Abies concolor	<u>390</u>
Total	1320

a fire 80 to 90 years ago. The larger trees are of all ages and most stands contain a few saplings and seedlings of all ages.

The stand structure varies throughout the type. A few large Douglas-fir over smaller Black oak and Douglas-fir, large Douglas-fir and ponderosa pine over smaller madrone, canyon live oak and black oak, even-aged canyon live oak and madrone with a few Douglas-fir, large black oak with pole size Douglas-fir and ponderosa pine and pole size stands of Douglas-fir and ponderosa pine. Examples of these different stands are given in Table III. A canyon live oak - Douglas-fir stand is illustrated in Figure 2.



Figure 2. Mixed-Evergreen forest dominated by canyon live oak and Douglas-fir.

Table III

Four different stand structures in the Mixed-Evergreen type.

Number of trees per 1/5 acre

Size class inches	<u>Stand 1</u>		<u>Stand 2</u>		<u>Stand 3</u>			<u>Stand 4</u>				
	D-fir	B.oak	D-fir	C.L.oak	Mad.	D-fir	P.pine	D-fir	P.pine	Mad.	C.L.oak	B.oak
0-10	37	9	-	19	-	12	-	4	-	-	7	-
10-20	16	13	2	17	11	13	3	2	-	-	6	-
20-30	3	-	-	-	-	2	2	1	-	3	3	2
30-40	-	-	-	3	-	5	2	-	1	2	-	1
40 +	2	-	4	2	-	1	1	3	2	-	-	-

The understory of these stands is very sparse with usually less than 2% of the forest floor covered with tree seedlings, shrubs or herbs. A small amount of shrubby canyon live oak seedlings and a few Douglas-fir seedlings can be found throughout the stand. The most common understory plants are Bromus tectorum and Hieracium albiflorum. The basal area averaged 525 square feet per acre with a range of 340 to 660 square feet per acre. The basal area periodic annual growth was 4.1 square feet per acre per year. The site was 120 feet in height for a 100 year old Douglas-fir.

Mixed-Conifer Forest Type

The Mixed-Conifer forest type occupies the largest area in the proposed natural area. This type is characterized by the presence of five conifers: white fir, (Abies concolor), incense cedar (Calocedrus decurrens), sugar pine (Pinus lambertiana), ponderosa pine and Douglas-fir. In general this type is the same as SAF Type 243, Sierra Nevada Mixed Conifer, Eyre, 1980.

This type has been divided into three phases based upon the presence or absence of white fir and Douglas-fir. The Pseudotsuga-Pinus Ponderosa phase occurs at lower elevations and on drier aspects where white fir is absent and ponderosa pine is the dominant tree species. The Abies Concolor phase occurs at higher elevations where white fir is the dominant species and Douglas-fir is absent. The Abies - Pinus - Pseudotsuga phase is the typical mixed-conifer type where all five species are mixed in an all-aged climax stand.

Pseudotsuga - Pinus ponderosa phase

This forest type is similar to the SAF type # 244, Pacific Ponderosa Pine - Douglas-fir, Eyre, 1980. Ponderosa pine and Douglas-fir together comprise the majority of the stand. White fir is present but only in small amounts. This forest type phase covers approximately 160 acres in the southeast portion of the proposed area, generally between 4000 and 4800 feet in elevation. The topography is moderately steep from 25% to 75% slope with occasional level benches. The aspect varies from southwest to southeast. The soils are the poorly developed gravelly loam.

This forest type is dominated by scattered large Douglas-fir and ponderosa pine over a dense pole-sized stand of ponderosa pine and Douglas-fir. The diameter of the larger trees varied from 40 inches to 85 inches with most of them between 50 and 60 inches. The pole-sized trees average 14 inches in diameter with a range from 6" to 34". These pole-sized trees came in after a fire 80 to 90 years ago. Most of the larger trees have fire scars.

The proportion of Douglas-fir and ponderosa pine varies considerably throughout the types; the predominance can even alternate within short distances. Incense cedar, sugar pine, and black oak also occur throughout the pole-sized stand. Canyon live oak occurs sporadically throughout the stand. A typical stand structure is indicated in Table IV and in Figure 3.



Figure 3. Large ponderosa pine and pole size Douglas-fir
in the *Pseudotsuga* - *Pinus ponderosa* phase.

Table IV

Typical Stand Structure of the *Pseudotsuga*-*Pinus ponderosa*
Phase of the Mixed-Conifer Forest Type

Size class inches	Number of trees per acre			
	Douglas-fir	Ponderosa pine	Sugar pine	Black oak
0-10	31	72	11	1
10-20	25	68	15	3
20-30	4	13	-	2
30-40	1	2	-	3
40+	3	4	-	-

The average basal area was 385 square feet per acre with a range of 310 to 460 square feet per acre. The basal area periodic annual growth was 3.7 square feet per acre per year. The site was 140 feet for a 100 year old Douglas-fir and 128 feet for a 100 year old ponderosa pine.

The understory in these forests is almost non-existent, with only a very few small poison oak and canyon live oak shrubs occurring on the forest floor. Pteridium aquilinum and Hieracium albiflorum are the most common herbs with a cover of less than 2%.

Abies - Pinus - Pseudotsuga phase

These forests consist of a mixture of white fir, incense cedar, sugar pine, ponderosa pine and Douglas-fir in an all-aged climax stand. These forests cover approximately 280 acres in the middle of the proposed area between 4400 and 5200 feet in elevation. The topography is moderate with most of the area consisting of level benches and slight southwest facing slopes. Three creeks dissect the area with fairly deep steep sided ravines. The soils are a deep gravelly loam.

The typical stand structure is illustrated in Table V and Figure 4 for these forests. The stand structure is quite varied through the area. Either of the five species locally dominate the stand.

Table V

Typical stand structure of the Abies - Pinus - Pseudotsuga
Mixed-conifer Forest Type

Number of trees per acre

Size, class in inches	White fir	Sugar Pine	P-pine	I. cedar	Dougl-fir
0-10	58	9	19	2	27
10-20	18	1	4	5	15
20-30	7	1	4	3	9
30-40	4	3	5	4	5
40+	2	1	8	2	5



Figure 4. Typical all-aged Mixed-Conifer forest.

White fir is the most common tree throughout this type, it is the dominate seedling and sapling and also occurs as a scattered larger tree. However, it does not reach the large sizes of the other tree species. Ponderosa pine dominates the larger age class. In some areas it dominates a stand by occurring in groups of very large trees. In reproduces throughout the stand and in a few areas it is the dominant pole size tree. Douglas-fir is the second-most common tree throughout this type. It occurs abundantly as a seedling, sapling and large tree. Incense-cedar is found scattered throughout the type as a single tree and occasionally as a small grove of very large trees. Sugar pine occurs the least in the stand. It is found as an occasional single tree

throughout the stand, often as the largest in a stand. An occasional large black oak can also be found in this type.

The average basal area is 600 square feet per acre with a range from 267 to 1025 square feet per acre. The basal area periodic annual growth was 2.7 square feet per acre per year. The site index is 130 feet in height for a 100 year old Douglas-fir. The high standing volume and low growth rate results from the predominance of large slow growing trees.

The shrub and herb understory in this type is very light, usually less than 5% coverage. The dominant understory plants are Bromus tectorum and Hieracium albiflorum with scattered Pyrola picta, Pteridium aquilinum and Adenocaulon bicolor.

Abies concolor phase

At the upper elevations of the Mixed-Conifer forest occur stands dominated by white fir, usually above 5000 feet in elevation. They occur on gravelly loam soils on moderate southwest facing slopes. These forests cover approximately 60 acres. The typical stand structure is illustrated in Table VI and in Figure 5.



Figure 5: Typical stand structure of a white fir dominated forest.

Table VI

Typical Stand Structure of the *Abies concolor* phase
of the Mixed conifer forest type

Size, class inches	# of trees per acre			
	White fir	Incense cedar	Ponderosa pine	Sugar pine
0-10	77	2	-	-
10-20	72	1	-	-
20-30	9	-	13	-
30-40	9	-	9	-
40+	4	5	8	7

White fir is the dominate tree in this type. It is the only species that occurs in a typical all-aged distribution, high numbers of

smaller trees with fewer larger trees. The other species usually occur only as large trees. Douglas-fir is absent from these stands. The average basal area was 654 square feet per acre with a range from 550 to 750 square feet per acre. The periodic annual growth was 3.9 square feet per acre per year. The site was 100 feet in height for a 100 year old white fir.

The very light understory, usually less than 1%, consists of scattered individuals of Rosa gymnocarpa, Amelanchier alnifolia, Elymus glaucus, Pyrola picta and Pteridium aquilinum. This type is similar to the white fir phase of the SAF type 243, Eyre, 1980, and similar to the white fir types as described by Sawyer and Thornburgh, 1977 and Laidlaw-Holmes, 1981, that are found throughout the western Klamath Region.

Oak Conifer Woodland

The central northwestern portion of the proposed area is considered to be a Oak-Conifer Woodland, which lies between the Mixed-Evergreen upper elevation limit of 3800 feet and the lower end of the chaparral at 5000 feet in elevation. This area consists of a mosaic of oak stands, small grass meadows and clumps of conifers. The most prevalent stand consists of an even canopy of large California black oak, ponderosa pine and large Douglas-fir with an understory of sapling size Douglas-fir or ponderosa pine. Some stands are a true woodland type, open stands of California black oak with a thick fern-grass understory dominated by Pteridium aquilinum and Elymus macounii.

The soils in this area appear to contain a high amount of clay. Occasional large slumps and bare erosional slopes on steep ravine sides indicate a certain amount of instability. The combination of unstable

soils, steep southwest slopes and past fires are probably the reasons why this area is dominately an oak-conifer woodland. With the cessation of fires most of this area will succeed to a Mixed-Conifer forest type.

The lower elevational oak-conifer stands will eventually succeed to a Ponderosa pine - Douglas-fir forest. This portion is estimated to be approximately 243 acres. Some of the stands are currently almost completely dominated by younger ponderosa pine and Douglas-fir.

The upper elevational portion of this type contains white fir seedlings and saplings along with ponderosa pine, incense-cedar and sugar pine seedlings. This indicates that the stands will probably succeed to the Abies concolor phase of the Mixed-Conifer type.

Chaparral

The upper end of the proposed natural area, mainly above 5000 feet in elevation, is covered by a large area of chaparral. It is dominated by Oregon white oak (Quercus garryana var. Breweri), Quercus vaccinifolia, Synphoricarpos mollis and Arctostaphylos patula. The aspect and slope is the same as the rest of the proposed area, moderate to steep southwest facing slopes. The soil is a very rocky gravelly loam.

Within the chaparral are patches of medium sized Oregon white oak with a fern-grass understory containing a small amount of white fir seedlings. Figure 6. Pure clumps of white fir are also located through the chaparral. In the lower portion of the chaparral are small patches of young dense California black oak and ponderosa pine with a few white fir seedlings. A general view of the chaparral area is illustrated in Figure 7.



Figure 6. Stand of oregon white oak with a few seedlings of white fir.

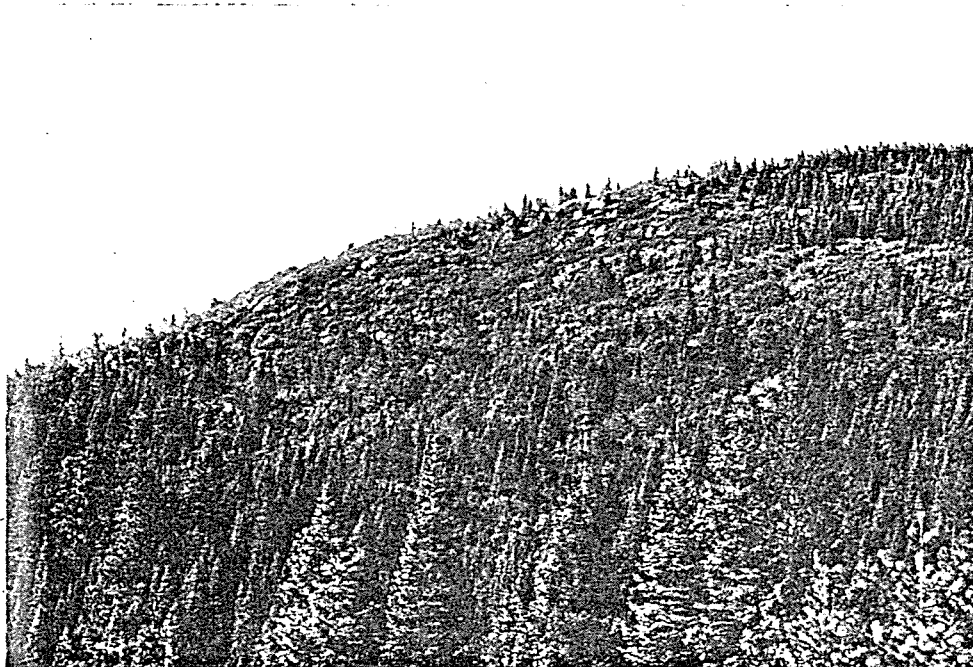


Figure 7. Chaparral and white fir stands at the upper end of the natural area.

The scattered regeneration of white fir throughout the chaparral indicates that the entire area will eventually succeed to the Abies concolor phase of the Mixed-Conifer type.

Along the crest of South Fork Mountain which is the northern boundary of the proposed area, lies an irregular stand of young white fir. These irregular stands of white fir have recently emerged from former brush, as evidenced by an understory of dead brush stems. This has occurred in areas of more favorable topographic position and soil.

Recent disturbances

Very few recent disturbances to the forest vegetation were observed in the proposed area. A relatively recent tractor-trail traverses through the area between Choptoy Creek and Hobart Creek. This tractor-trail extends from the old South Fork Mtn Crest Road #1502 to south of the proposed natural area. This tractor-trail is barely distinguishable in some localities, in other areas it cuts deeply into sideslopes. A considerable number of large snags were cut adjacent to this trail in the flat bench area between Hobart and Choptoy Creeks. All cut trees are still where they had fallen. Apparently no live trees were cut. This tractor-trail winds through the area, avoiding all dense patches of living trees. The trail does not detract from the naturalness of the area. The past felling of snags has eliminated some possible bird nesting sites.

In the very upper northeast portion of the proposed natural area, a series of old parallel tractor trails were constructed to enhance tree regeneration. Most of these have almost overgrown with brush.

The evidence of fresh cowpies in the small open meadows of the Oak-Conifer type indicates that area is still grazed under past Range

Allotments. The past grazing may be the reason why the meadow-glades are dominated by the introduced Bromus Tectorum, cheat grass and Elymus caput-medusae, medusahead. The grazing by cattle does not appear to have affected the conifer regeneration. Considerable browsing was observed in the brush field; on Oregon white oak and a few conifer seedlings, however, all evidence indicates that this is deer browse.

Observed Wildlife

Wildlife was not inventoried, however, numerous deer were encountered in the oak-conifer woodland types. On one occasion a prairie or peregrine falcon was observed flying over the proposed area.

Summary

The vegetation of the proposed Ruth Research Natural Area can be divided into four general types with five phases. These recognized units are apparently correlated with elevation and past history. The best stands are the Mixed-Conifer type on moderate topography.

Evaluation of the Area

The area was proposed to represent the Pacific ponderosa pine - Douglas-fir forest type (SAF type 244). This type is defined as (Eyre, 1980) "Ponderosa pine and Douglas-fir together comprise a majority of the stocking. White fir is only a minor associate, a distinction that separates this type from the Sierra Nevada mixed conifer type" (Type # 243). The 160 acres of the Douglas-fir - Ponderosa pine phase of the Mixed-Conifer type meets this description very well, Douglas-fir and Ponderosa pine comprise a majority of the stocking.

In the Abies-Pinus - Pseudotsuga phase the majority of the stocking under 20 inches in diameter is white fir while a majority of the large trees above 30 inches in diameter are ponderosa pine and Douglas-fir. Since white fir is more than a minor associate this phase should be considered as SAF type 243.

The lower elevational Mixed-Evergreen type in the proposed area contains a relatively small amount of ponderosa pine. A good portion of the stands contain no ponderosa pine at all. This phase is similar to the ponderosa pine phase of the Mixed-Evergreen as outlined by Sawyer et al. (1977), rather than the SAF type 244.

The two lower elevation types in the proposed area, Mixed-evergreen and Pseudotsuga-Pinus ponderosa phase are representative of low elevation west slopes of the inner coast range from mid Humboldt through Mendocino counties.

The higher elevation mixed and white fir dominated forests are not equivalent to SAF type # 244 but are representative of the high elevation forest of the southern inner western coast ranges.

LITERATURE CITED

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Appendix I. Taxa recognized within the proposed Ruth Research Natural Area. Collected plants were identified using vouchers deposited in the Humboldt State University Herbarium (HSC). Nomenclature follows P. Munz. 1959. A California flora. University of California Press, Berkeley. 1581 p.

Aceraceae

Acer macrophyllum

Anacardiaceae

Rhus diversiloba

Apocynaceae

Apocynum androsaemifolium

Aspidiaceae

Dryopteris arguta
Polystichum imbricans
Polystichum munitum

Berberidaceae

Berberis nervosa

Betulaceae

Alnus rhombifolia
Alnus rubra
Corylus cornuta

Campanulaceae

Campanula prenanthoides

Caprifoliaceae

Symphoricarpos acutus
Symphoricarpos mollis

Caryophyllaceae

Silene californica

Compositae

Achillea borealis
Adenocaulon bicolor
Agoseris aurantiana
Artemisia Douglasiana
Cirsium vulgare
Erigeron inornatus
Hieracium albiflorum
Hieracium greenii
Lagophylla ramosissima

Cornaceae

Cornus stolonifera

Cupressaceae

Calocedrus decurrens

Cuscutaceae

Cuscuta ceanothi

Cyperaceae

Carex multicaulis

Dipsacaceae

Marah oreganus

Ericaceae

Arbutus menziesii
Arctostaphylos patula

Fagaceae

Castanopsis chrysophylla
Castanopsis chrysophylla var. *minor*
Quercus Kelloggii
Quercus Garryana
Quercus Garryana var. *Breweri*
Quercus chrysolepis
Quercus vaccinifolia

Garryaceae

Garrya Fremontii

Gramineae

Agropyron trachycaulum
Bromous laevipes
Bromus tectorum
Dactyloctenium aegyptium
Deschampsia elongata
Elymus caput-medusae
Elymus glaucus
Elymus macounii
Koeleria cristata
Phleum pratense
Sitanion hystrix

Hypericaceae

Hypericum anagalloides

Iridaceae

Iris tenuissima

Uncaceae

Juncus Mertensianus

Labiatae

Monardella adoratissima

Monardella purpurea

Monardella villosa

Stachys rigida

Leguminosae

Lupinus Andersonii

Lupinus latifolius

Liliaceae

Disporum Hookeri

Veratrum californicum

Onograceae

Epilobium brachycarpum

Gayophytum Nuttallii

Orchidaceae

Eburophyton Austiniae

Goodyera oblongifolia

Habenaria unalascentis

Pinaceae

Abies concolor

Pinus lambertiana

Pinus ponderosa

Pseudotsuga Menziesii

Polemoniaceae

Collomia grandiflora

Polygonaceae

Eriogonum nudum

Polygonum spargulariaeforme

Rumex Acetosella

Rumex angiocarpus

Rumex salicifolius

Polygalaceae

Polygala cornuta

Primulaceae

Trientalis latifolia

Pteridaceae

Pteridium aquilinum

Pellaea brachyptera

Pyrolaceae

Chimaphila umbellata

Pterospora andromedea

Pyrola picta

Pyrola picta ssp. *dentata*

Ranunculaceae

Anemone deltoidea

Rhamnaceae

Ceanothus cordulatus

Rosaceae

Amelanchier alnifolia

Amelanchier pallida

Fragaria californica

Holodiscus discolor

Osmaronia cerasiformis

Prunus emarginata

Prunus subcordata

Prunus virginiana

Rosa gymnocarpa

Rubus leucodermis

Rubiaceae

Galium Aparine

Galium Bolanderi

Kelloggia galioides

Salicaceae

Salix Scouleriana

Saxifragaceae

Philadelphus Gordonianus

Ribes lacustre

Scrophulariaceae

Mimulus platylaemus

Penstemon Rattanii

Verbascum Thapsus

Taxaceae

Taxus brevifolia

Umbelliferae

Heracleum lanatum

Lomatium macrocarpum

Osmorhiza chilensis

Violaceae

Viola gıabella